

What is claimed is:

1. A method of treating diseased cells in a human or other animal body comprising the steps of:

5 providing particles comprising one or more nanoparticles of magnetic material, the particles optionally including medication;

introducing the particles into the body;

directing the particles into or adjacent the diseased cells; and

10 applying a magnetic field to the magnetic nanoparticles to treat the diseased cells by magnetically induced motion of the nanoparticles or by magnetically induced release of the medication.

2. The method of claim 1 wherein the application of the magnetic field treats the diseased cells by moving the nanoparticles to damage or destroy the cells.

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3. The method of claim 1 wherein the particles include medication and the application of the magnetic field effects delivery of the medication to the diseased cells.

4. The method of claim 3 wherein the medication comprises a cytotoxin.

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5. The method of claim 1 wherein the particles comprise magnetic nanoparticles coated with bio-compatible material.

6. The method of claim 5 wherein the bio-compatible material comprises a material selected from the group consisting of bio-compatible polymers, dextran, silicon oxide and gold.

7. The method of claim 1 wherein the particles are introduced into the body by  
5 injection.

8. The method of claim 1 wherein the particles are directed into or adjacent the diseased cells by one or more targeting molecules attached to the particles.

10 9. The method of claim 8 wherein the targeting molecules comprise an antibody or a peptide.

10. The method of claim 1 wherein the particles are directed into or adjacent the diseased cells by magnetic navigation.

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11. The method of claim 1 wherein the particles are directed into the diseased cells by magnetic transfection.

12. The method of claim 1 wherein the particles are attached to molecules to  
20 stimulate endocytosis of the particles by the cells.

13. The method of claim 1 wherein the nanoparticles of magnetic material are elongated along one dimension and the magnetic field rotates the nanoparticles to mechanically damage diseased cells.

5 14. The method of claim 13 wherein the magnetic field is an AC magnetic field at a frequency in the range 1 Hz to 500 Hz..

15. The method of claim 1 wherein the magnetic field laterally oscillates the nanoparticles to mechanically damage diseased cells.

10 16. The method of claim 1 wherein the particles comprise a heat sensitive reservoir of medication and the application of the magnetic field to the nanoparticles provides heat to effect delivery of the medication.

15 17. The method of claim 16 wherein the magnetic field is an AC magnetic field at a frequency in range 1 KHz - 5 MHz.

18. The method of claim 1 wherein the particle comprises a reservoir of mechanically retained medication and the application of the magnetic field to the nanoparticles provides  
20 mechanical damage to the reservoir to effect delivery of the medication.

19. The method of claim 18 wherein the magnetic field provides mechanical damage to the particle by moving it to wear away portions of the particle.

20. The method of claim 18 wherein the magnetic field provides mechanical damage to the particle by moving nanoparticles within the particle.

21. The method of claim 1 wherein the step of applying a magnetic field to the  
5 magnetic nanoparticles comprises an application of a magnetic field to mechanically damage the diseased cells by rotating or oscillating the nanoparticles and an application of a second magnetic field to thermally damage the diseased cells by heating the nanoparticles.

22. The method of claim 1 wherein the particles comprise a heat sensitive reservoir of  
10 medication and the application of the magnetic field to the nanoparticles provides heat to effect delivery of the medication and to damage the diseased cells by heat.

23. The method of claim 1 wherein the particles comprise a reservoir of mechanically retained medication and the application of the magnetic field comprises an application of a first  
15 magnetic field to mechanically damage to the reservoir to effect delivery of the medication and an application of a second magnetic field to heat the nanoparticles for thermal damage to the diseased cells.

24. The method of claim 1 further comprising the step of confirming the adjacency of  
20 the particles to diseased cells or tissue prior to applying the magnetic field.

25. The method of claim 22 wherein the adjacency is confirmed by MRI imaging.

26. An article for treating diseased cells in human or other animal bodies comprising:  
a particle comprising one or more nanoparticles of magnetic material, the particle coated  
with biocompatible material and attached to a targeting molecule for targeting diseased cells.

5 27. The article of claim 24 wherein the nanoparticles are elongated in one dimension.

28. The article of claim 24 wherein the particle further comprises a reservoir of  
medication that can be released by heat or by mechanical damage to the particle.

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